

EME 521 - Computational Reservoir Geomechanics
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https://personal.ems.psu.edu/~fkd/courses/comp_res_geomechs/2020/index.html

Day 1 - Monday

1. **Introduction to Computational Reservoir Geomechanics [1:1]** [09:00-10:15]
2. Fluid Flow and Pressure Diffusion [2:-]
 - a. Finite Element Methods [2:1] [Online]
 - b. Conservation Equations and Galerkin Approximation [2:2] [Online]
 - c. EGEEfem Tutorial [2:2a] [Online]
 - d. 2D Triangular Constant Gradient Elements [2:3] [Online]

Day 2 - Tuesday

1. Fluid Flow and Pressure Diffusion, [2:-] Continued
 - a. 1D Isoparametric Elements [2:4] [Online]
 - b. 2D Isoparametric Elements and Numerical Integration [2:5] [Online]
 - c. Transient Behavior – “Mass” Matrices [2:6] [Online]
 - d. Transient Behavior – Integration in Time [2:7] [Online]
 - e. **Overview of EGEEfem** [19:00-20:00]

Day 3 - Wednesday

1. Mass Transport [3:-]
 - a. Conservation of Mass and 1D Models [3:1] [Online]
 - b. 2D Constant Gradient Elements [3:2] [Online]
 - c. Sorption and Reactive Transport [3:3] [Online]
 - d. **Outline of Course Presentation Project** [19:00-20:00]

Day 4 - Thursday

1. Momentum Transport [4:-]
 - a. Fluids, Navier-Stokes Equations [4:1] [Online]
2. Solid Mechanics [5:-]
 - a. 1D and 2D Elements [5:1] [Online]
 - b. Constitutive Equations [5:2] [Online]
 - c. Preamble for Coupled Systems [6:0] [Online]
 - d. **Question & Answer and Discussion** [19:00-20:00]

Day 5 - Friday

1. “Coupled” Multiphysics Systems [6:-]
 - a. Dual-Porosity/Dual-Permeability Models [6:1] [Online]
 - b. Coupled Hydro-Mechanical Models [6:2] [Online]
 - c. ComSol Models for HM Coupling [6:3] [Online]
 - e. EGEEfem Models for HM Coupling [6:4] [Online]
 - f. **Question & Answer and Discussion** [19:00-20:00]

Day 5+ – Sunday August 9th – Midnight China Time

1. Presentations due